

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. Please amend claims 1-2, 4-5, 7-8, 10-11, 13-14, 16-17 as follows:

1. (Currently Amended) A digital audio signal processing method for converting a digital audio signal, comprising:
 - a step of cutting parts out of the digital audio signal by plural windows having different sizes;
 - a [[plurality of steps]] step of calculating a self correlation coefficient [[coefficients]], based on each [[piece of the]] cut-out [[parts]] part of the digital audio signal;
 - a step of determining cut-out ranges of time and phase changes based on the self correlation coefficients;
 - a step of compressing the cut-out ranges to form compressed data patterns;
 - a step of classifying the [[parts]] compressed data patterns into [[a class]] classes based on the phase changes calculation results of the self correlation coefficients;
 - a step of selecting a set of prediction coefficients based upon classification of the compressed data patterns; and
 - a step of generating a new digital audio signal based upon the prediction coefficients and the cut-out ranges which is obtained by the digital audio signal, by prediction-
operating the digital audio signal by the selected prediction method corresponding to the obtained class,
 - ~~wherein a first step of calculating self correlation coefficients uses fewer samples than a second step of calculating self correlation coefficients.~~

2. (Currently Amended) The digital audio signal processing method as defined in claim 1,

wherein in said ~~[[plurality of steps]]~~ step of calculating the self correlation coefficients, at least a general searching range and a local searching range are provided as targets for calculating the self correlation coefficients with respect to the digital audio signal, and the self correlation coefficients are calculated based on the searching ranges.

3. (Canceled)

4. (Currently Amended) A digital audio signal processing device for converting a digital audio signal, comprising:

self correlation coefficient calculation means for cutting parts out of the digital audio signal by plural windows having different sizes;

a ~~[[plurality of]]~~ means for calculating a self correlation ~~[[coefficients]]~~ coefficient based on each ~~[[piece of the]]~~ cut-out ~~[[parts]]~~ part of the digital audio signal;

means for determining cut-out ranges of time and phase change based on the self correlation coefficient;

means for compressing the cut-out ranges to form compressed data patterns;

class-classification means for classifying the ~~[[parts]]~~ compressed data patterns into ~~[[a class]]~~ classes based on the ~~calculation results of the self correlation coefficients~~ phase changes;

selection means for selecting a set of prediction coefficients based on the compressed data patterns; and

prediction calculation means for generating a new digital audio signal based upon the prediction coefficients and the cut-out ranges which is obtained by converting the digital audio signal, by prediction operating the digital audio signal by the selected prediction method corresponding to the obtained class,

wherein a first means for calculating self correlation coefficients uses fewer samples than a second means for calculating self correlation coefficients.

5. (Currently Amended) The digital audio signal processing device as defined in claim 4,

wherein said [[plurality of]] self correlation coefficient calculation means is provided with at least a general searching range and a local searching range as targets for calculating the self correlation coefficients with respect to the digital audio signal, and calculates the self correlation coefficients based on the searching ranges.

6. (Canceled)

7. (Currently Amended) A computer-readable medium adapted to store program code executed by a digital audio signal processing device, the program code including:
a step of cutting parts out of the digital audio signal by plural windows having different sizes;

a ~~[[plurality of steps]]~~ step of calculating a self correlation coefficient for each
cut-out part ~~[[coefficients]]~~;

a step of determining cut-out ranges of time and phase changes based on the self
correlation coefficients;

a step of compressing the cut-out ranges to form compressed data patterns;

a step of classifying the ~~[[parts]]~~ compressed data patterns into ~~[[a class]]~~ classes
based on the phase changes ~~calculation results of the self correlation coefficients~~;

a step of selecting a set of prediction coefficients based upon classification of the
compressed data patterns; and

a step of generating a new digital audio signal based upon the prediction
coefficients and the cut-out ranges ~~that is obtained by converting the digital audio signal, by~~
~~prediction operating the digital audio signal by the selected prediction method corresponding to~~
~~the obtained class~~;

~~wherein a first step of calculating self correlation coefficients uses fewer samples~~
~~than a second step of calculating self correlation coefficients.~~

8. (Currently Amended) The computer-readable medium as claimed in claim
7,

wherein in said ~~[[plurality of steps]]~~ step of calculating the self correlation
coefficients, at least a general searching range and a local searching range are provided as targets
for calculating the self correlation coefficients with respect to the digital audio signal and the self
correlation coefficients are calculated based on the searching ranges.

9. (Canceled)

10. (Currently Amended) A learning method for generating prediction coefficients which are used for prediction calculation of conversion processing by a digital signal processing device for converting a digital audio signal, said learning method comprising:

a step of generating, from a desired digital audio signal, a student digital audio signal in which the digital audio signal is degraded;

a step of cutting parts out of the student digital audio signal by plural windows having different sizes;

a [[plurality of steps]] step of calculating a self correlation coefficient for each cut-out part [[coefficients]],

a step of determining cut-out ranges of time and phase changes based on the self-correlation coefficients;

a step of compressing the cut-out ranges to form compressed data patterns;

~~wherein a first step of calculating self correlation coefficients uses fewer samples than a second step of calculating self correlation coefficients;~~

a step of classifying the [[parts]] compressed data patterns into [[a class]] classes based on the ~~calculation results of the self correlation coefficients~~ phase changes;

a step of calculating prediction coefficients corresponding to the class based on the digital audio signal and the student digital audio signal; and

a step of storing the prediction coefficients associated with each class.

11. (Currently Amended) The learning method as claimed in claim 10, wherein in said ~~[[plurality of steps]]~~ step of calculating ~~the~~ self correlation coefficients, at least a general search range and a local search range are provided as targets for calculating targets of the self correlation coefficients, and the self correlation coefficients are calculated based on the searching ranges.

12. (Canceled)

13. (Currently Amended) A learning device for generating prediction coefficients which are used for prediction calculation of conversion processing by a digital signal processing device for converting a digital audio signal, said learning device comprising:

student digital signal processing means for generating, from a desired digital audio signal, a student digital audio signal in which the digital signal is degraded;

self correlation coefficient calculation means for cutting parts out from the student digital audio signal by multiple windows having different sizes;

a ~~[[plurality of]]~~ means for calculating a self correlation ~~[[coefficients]]~~
coefficient for each cut-out part,

~~wherein a first means for calculating self correlation coefficients uses fewer samples than a second means for calculating self correlation coefficients~~ means for determining cut-out ranges of time and phase change based on the self correlation coefficient;
means for compressing the cut-out ranges to form compressed data patterns;

class-classification means for classifying the ~~[[parts]]~~ compressed data patterns into ~~[[a class]]~~ classes based on the ~~calculation results of the self correlation coefficients~~ phase changes;

prediction coefficient calculation means for calculating prediction coefficients corresponding to the class based on the digital audio signal and the student digital audio signal; and

storage means for storing the prediction coefficients associated with each class.

14. (Currently Amended) The learning device as defined in claim 13, wherein said ~~[[plurality of]]~~ self correlation coefficient calculation means is provided with at least a general searching range and a local searching range with respect to the digital audio signal as targets for calculating the self correlation coefficients and calculates the self correlation coefficients based on the searching ranges.

15. (Canceled)

16. (Currently Amended) A computer-readable medium adapted to store program code that is executed by a learning device, the program code including:
a step of generating, from a desired digital audio signal, a student digital audio signal in which the digital audio signal is degraded;
a step of cutting parts out of the student digital audio signal by plural windows having different sizes;

a ~~[[plurality of steps]]~~ step of calculating a self correlation coefficient for each cut-out part ~~[[coefficients,]]~~;

~~wherein a first step of calculating self correlation coefficients uses fewer samples than a second step of calculating self correlation coefficients~~ a step of determining cut-out ranges of time and phase changes based on the self-correlation coefficients;

a step of compressing the cut-out ranges to form compressed data patterns;

a step of classifying the ~~[[parts]]~~ compressed data patterns into ~~[[a class]]~~ classes based on the ~~calculation results of the self correlation coefficients~~ phase changes;

a step of calculating the prediction coefficients corresponding to the class based on the digital audio signal and the student digital audio signal; and

a step of storing the prediction coefficients associated with each class.

17. (Currently Amended) The computer-readable medium as claimed in claim 16,

wherein in said ~~[[plurality of steps]]~~ step of calculating self correlation coefficients, at least a general searching range and local searching range are provided with respect to the digital audio signal as calculation targets of the self correlation coefficients and the self correlation coefficients are calculated based on the searching ranges.

18. (Canceled)